



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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**Subject: POLREP #10 - Progress Pollution Report
California Gulch NPL – Leadville Mine Drainage Tunnel (LMDT)
Leadville, Lake County, Colorado**

**To: EPA Headquarters:
John Irizarry
Eugene Lee
EPA Region 8 OCPI: Sonya Pennock**

**From: Hays Griswold, On Scene Coordinator (OSC)
Craig Myers, (OSC)
Curtis Kimbel, R8 Removal Manager
8EPR-ER**

Date: 5/12/2008, 1730 hrs MT

Reporting Period: 1600 Hrs MT 4/24/2008 to 1600 Hrs MT 5/13/2008

ABSTRACT

Site #:	0829	Response Authority:	CERCLA
NPL Status:	Listed	Incident Category:	Emergency Removal
CERCLIS ID #:	COD980717938	RCRIS ID#:	
Response Type:	Fund-lead	Contract #:	D.O. #:
Action Memo. Date:	3/12/08	Start Date:	02/19/2008
Removal Mob. Date:	02/22/2008	Removal Compl. Date:	TBD

1. Introduction

1.1 Background

The Leadville Mine Drainage Tunnel (LMDT) is located in west central Colorado, near the town of Leadville. The US Bureau of Mines constructed the tunnel to provide centralized drainage for portions of the extensive, interconnected mine workings in the Leadville Mining District. The Bureau of Mines contracted LMDT construction during the periods 1943-1945 and 1950-1952. When construction ceased, the LMDT extended

for 11,299 feet from the portal. Ownership of the tunnel transferred to the US Bureau of Reclamation (BOR) in December 1959. Subsequently, BOR constructed a Waste Water Treatment Plant (WWTP) near the LMDT portal to treat the tunnel effluent prior to discharge into the Arkansas River.

Since 1959, several tunnel collapses, trapping water within the tunnel, have been documented. These blockages have resulted in decreased LMDT effluent flow rates, documented differences in water elevations at various points along the tunnel alignment, and rising water levels in the retained 'mine pool'.

According to the BOR, the LMDT currently drains at the rate of approximately 1000-1100 gallons per minute (GPM). The entire volume is directed to the nearby water treatment plant where the effluent, containing elevated levels of iron, manganese, zinc, and lead, is effectively treated before discharging to the Arkansas River.

1.2 Threat Determination

Due to tunnel blockage, the LMDT is inaccessible beyond station 4+00 (400 feet in from the portal). Beyond station 4+00, the numerous collapses have caused water to back up in the main tunnel as well as the interconnected subterranean network. Accordingly, estimates range from 0.5 to 1.0 billion gallons of water currently impounded behind the various LMDT collapses. All of the impounded water is assumed to be contaminated with metals leached from the surrounding mineralized zone(s).

Due to continuing LMDT structural deterioration, the gradually-increasing hydrostatic head on water retained behind the collapses, and the increasing volume of water retained in the LMDT, there exists a potential for catastrophic release of contaminated water (a 'blowout') through the portal. In addition, newly-discovered surface seeps in the area, at elevations above the portal, indicate a rise in water level behind the plugs. The existing WWTP is incapable of treating effluent volumes anticipated during a blowout.

Private residential units have been established between the LMDT portal and the confluence with the Arkansas River. Such residential units could be directly impacted by LMDT effluent during a blowout event.

2. Current Activities

2.1 Objectives

GAW Shaft

Pump water from the GAW Shaft to:

- Attempt to reduce the groundwater table to affect water levels in the mine pool.
- Reduce seeps of water in California Gulch

Note: Pumping of the GAW Shaft is scheduled to continue as long as water meets water quality standards and/or until the LMDT dewatering well is operational

LMDT Dewatering Well

- Drill well at or near the 46-66 location in the tunnel and pump water from behind blockage to reduce water levels in the tunnel and decrease pressure on the blockage.
- Pump at rates compatible with the capacity of the BOR's water treatment plant.

2.2 Operations

The GAW Shaft, about a mile away from the LMDT, drains via artesian flow, uncontaminated water from mine workings near, and at a higher elevation, than those connected to the LMDT. In an attempt to relieve some fraction of hydrostatic head being placed on the underground water retained by the LMDT plugs, water will be pumped from the GAW Shaft and discharged to California Gulch (Cal Gulch), a drainage leading to the Arkansas River. GAW Shaft pumping should also reduce the volume of contaminated water being released to the environment via some of the recently-discovered surface seeps above the LMDT portal. **GAW effluent water quality, currently acceptable for direct release, is being continuously monitored. GAW pumping was temporarily halted from April 29th through May 3rd to accommodate a dye test, performed by CDPHE, in the California Gulch. This test will help CDPHE study the effects of a high snow pack run-off year on sediment loading of the Arkansas River. This test did not appear to have any adverse effects on the conditions in the LMDT.**

Water samples are routinely collected from the site. Water quality samples taken from the Cal Gulch area have revealed water quality levels to meet Class 1 Cold Water Aquatic Standards.

On Wednesday, February 27, 2008 at 11:00 AM an interim pump was installed in the GAW shaft and pumping operations initiated. The pump operated continuously from February 27th to March 4th, 2008, pumping approximately 150-200 GPM from the GAW Shaft into nearby Cal Gulch. On Wednesday 5 March, 2008, the existing smaller pump was disconnected and removed from the well to allow for installation of the new, larger pump described below.

A custom fabricated pump designed specifically for pumping from the GAW Shaft has been installed. **As of 4:00 PM Tuesday, May 13th 2008 the pump is running at 450 GPM, and over 42,000,000 gallons have been pumped from the well.**

EPA OSCs are developing specifications for the pumping system required for dewatering the LMDT, as well as working with BOR to design the structures necessary to tie the pipeline into the LMDT WTP.

The driller, Layne-Christensen, arrived on-site with their equipment at approximately 06:00 PM on May 12th, and began setting up. Setup is continuing today, however adverse weather conditions are hampering the effort. Drilling could start as early as 03:00 PM Tuesday May 13th, pending approval of the on-site safety officer and the OSC. Heavy snow is currently making the equipment very slippery to work on.

ERRS crews have completed laying back slopes and setting grade along the length of the pipeline. Approximately 1500 feet of pipeline has been bedded, installed, and backfilled, with an additional 1,000 feet ready to be installed. Pipe welding has been suspended today due to adverse weather conditions and will resume as conditions permit. Cleanouts and vents have been and will continue to be installed to BOR's specifications.

The boring under the scenic railway has been completed. Upon resumption of welding activities, the pipeline will be installed and grouted in the boring under the railway. The boring and grouting will be completed prior to the railway's required seasonal opening date of May 24th, 2008. Boring crews are currently setting up to perform the boring under the highway today, Tuesday May 13th, which should be completed by the end of the week.

Past Activities:

02/20/08	Leadville town meeting;
02/22/08	Remove old GAW Shaft pump;
02/25/08	EPA-BOR begin regularly scheduled technical meetings re: LMDT plugging and pumping;
02/26/08	Clear snow from the GAW Shaft portal;
02/27/08	Deliver portable generator and temporary pump to the Shaft portal;
02/27/08	GAW Shaft temporary pump operation began at 11 AM MT.
02/29/08	Installation of crushed rock roadbed in and around GAW Shaft worksite began.
03/04/08	Permanent pump and piping arrive at GAW Shaft portal.
03/04/08	EPA assigned an additional OSC, Craig Myers, to assist Lead OSC Hays Griswold.
03/05/08	Electrical installation scheduled completion.
03/06/08	New pump installed at GAW Shaft.
03/31/08	LMDT location 46-66 survey complete and drill pad under construction.
04/01/08	Survey of pipeline alignment complete
04/07/08	Award of Drilling Contract

Estimated Schedule of Future Events (Note: Schedule subject to change due to unforeseen fluctuations in field conditions)

<u>Task</u>	<u>Est. Completion Date</u>
Award Drilling Contract	April 7 (completed)

Mobilize Drill Rig to Site	May 12 (completed)
Drill and Case Hole (10-15 days)	Underway
Conduct Pump Test (4 days after drilling of well is complete)	May 13 to May 20
Install Permanent Pump (4-10 days)	May 17 to May 30
Provide Power to Pump (3-4 days)	May 21 to June 3

Installation of Pipeline to Water Treatment Plant:

<u>Task</u>	<u>Est. Completion Date</u>
Survey Pipeline Alignment:	April 1 (completed)
Construct and bury approx 6,000 feet of 12" HDPE Pipeline 10 feet below surface (30-40 days)	Underway
Terminate Pipeline at WTP (10 days)	May 10 to May 20
Terminate Pipeline at Location 46-66 (3-4 days after pump install complete)	May 25 to June 7
EPA Ready to begin Pumping to WTP	May 26 to June 8

2.3 Future Plans

At a public meeting held in Leadville on February 20, 2008, EPA committed to ‘dewatering’ the LMDT behind the collapses so as to ameliorate the threat of a LMDT catastrophic release. Such actions will include:

- Installation of a ‘dewatering well’ and associated pipeline.

2.4 Existing water quality data will be continually verified and/or updated.

2.5 Finance

- A Removal ceiling of \$4,500,000 has been authorized.

2.6 Issues

- Key issues, other than those discussed above, have not been identified at this time.

3. Participating Entities

EPA
BOR
Colorado Department of Public Health and Environment (CDPHE)
Leadville

- 4. Personnel on Site**
- 4.1 EPA
- 4.2 BOR
- 4.3 CDPHE
- 4.4 Leadville City Employees
- 4.5 Lake County Employees